3 Myths and 3 Challenges
To Bring System Administration Out of the Dark Ages

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From Dark Ages passed ...
To enlightenment ... ?
To an industrial present ...
1W. Agriculture Wave - Tend it by hand
2W. Industrial Wave - Amplify Man with Machine
3W. Knowledge Wave - Learn and Design with Intent
2W Myth 1: ordered sequential control
or why British people like to queue up

- The flow-chart / script era
- Parallelization is the key to scale and search
- Stability is convergence
  - Going in circles?
  - Limit cycle or fixed point
The Chomsky hierarchy

- Complex grammars ARE order dependent
- Sometimes the ordering is artificial – just 2nd wave thinking
- Many cases can be approximated without that complexity if we have an alternative model – that reduces fragility
- Fragility = design error (bad engineering)
2W Myth 2: determinism & rollback
Or why you shouldn't walk in front of trains

- We don't control all details about environment
  - Critical sections
  - Single user mode
  - Thread locks
  - Transaction control
- Deal with the outcome not the mistake
- Clinging on to certainty
Reducing risk without time-travel

- Rockets
  - Planning
  - Overhead
  - One chance only
  - Major roll-out
- 747
  - Easy to make
  - Reusable
  - Adapt
2W Myth 3: hierarchy or bust
or why trees are losing to human beings

- A tree is just a spanning set for a more general set of relationships
- Trees cut parts off from one another
- Lock it down .. marginalize
- Depth-vs-breadth problem
- Trees are fragile
- Trees often imply rank or authority, according to old-world conventions
Lie back and think about sets …

- A more general approach
- Tag labels are like sets that can overlap
- CFEngine class model
- Great flexibility and robustness
- As complexity increases, mutual exclusion fails as an organizing principle
3W challenge 1: emergent complexity
or why you shouldn't have to tidy your room

- Empiricism – see what happens before locking everything down
- Why are we afraid of complexity?
- One size does not fit all:
  - e.g. Everyone should speak Norwegian
  - “Any colour as long as it's black”
- Complexity allows us to escape the growth spiral by diversifying
Today's IT is not a Swiss Watch...

...more like a muddy ecosystem
2W challenge 2: commerce alignment
or why rockets have trajectories
but fireworks just blow up

Business drives the world
Technology has a purpose

- Might be programmed
- Or opportunistic

The tools should work for us, not the other way around...
From 2\textsuperscript{nd} to 3\textsuperscript{rd} Wave tools ...

Some technologies don't cause a fuss...
What actually drives society and its progress?

The freedom equation: $F = me^3$
The real cloud
3W challenge 3: knowledge
Or why you should consult the plans before digging a hole

- Experience is being diluted and harder to come by
- Mentoring doesn't scale or meet QA requirements
- Knowledge is more than information
  - Context
  - Meaning
  - Experience
- Patterns compress information and add meaning
Who needs knowledge?

- Everyone who didn't build it with their bare hands
  - What, when, where, how, why?
Meaning vs Information

Patterns bring meaning to cognition
Significance...
From Answers to Questions

How do we help sysadmins (infrastructure engineers) ask the right questions?

Context    Boundary Conditions

Associative inference    WHY?
The End?

- What are we waiting for? No time to stand still!
  - The 3\textsuperscript{rd} Wave is amongst us!
- Myths that bind us to the past
  - Serial thinking, determinism, hierarchy
- Challenges that invite the future
  - Emergence, goal orientation, knowledge
- Next:
  - Change the face of system administration
  - → Infrastructure engineering
Thank you

and enjoy the rest of the conference

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